to have been made, for several reasons. These gentlemen had no right to risk their lives or health without sufficient reason while in the public service. It was unnecessary to carry out the experiments on man, as lower animals were available. Even if one or both had taken the disease, the experiments would have been useless, as they were living in the endemic zone and liable to take the disease naturally. What was the use, for example, of two non-immunes drinking urine from a case of Malta fever if they neglected in the first place to demonstrate that the urine contained the *Micrococcus melitensis?* As only one sample of urine in ten contains the cocci, it was ten to one against their taking the disease. Such thoughtless experiments ought not to be encouraged by being recorded in text-books as praiseworthy actions or serious attempts in the investigation of disease. With the exception of slight blemishes such as these, which, indeed, are inseparable from text-books, the descriptions of the various tropical diseases are good, and some are excellent. Especially is the description of the symptoms and treatment of these tropical maladies quite practical and useful.

The fourth section is taken up with practical hints in microscopy, photography, disinfection, examination of blood, &c. This part of the book contains much sound advice on the best microscopes and cameras for tropical work, on stains, staining methods, modes of preparing blood and tissues for examination, and should prove very useful to medical men in out-of-the-way places out of touch with books and laboratories.

The book concludes with several appendices on sanitary conventions, vegetable poisons of the tropics, how to collect flies, ticks, &c.

This text-book on tropical medicine can be confidently recommended to colonial surgeons and medical officers of the British and Indian Services as containing a vast amount of data from various sources, with practical hints from the author's personal experience and observation, which makes it an admirable *vade mecum* when the exigencies of travel render the carriage of several books impossible.

DAVID BRUCE.

## A MONOGRAPH OF BRISTLE-WORMS..

*A Monograph of the British Annelids.* Vol. ii., part i. Polychæta, Nephthydidæ to Syllidæ. By Prof. W. C. McIntosh, F.R.S. Pp. viii+232+lxx plates. (London: Dulau and Co., 1908.) Price 25s. net.

WHEN Huxley was appointed professor in the Jermyn Street School of Mines, his first great scheme was the publication by Government of a zoological coast survey of Great Britain, and one of the first groups to be selected was this one of the Annelids. Unfortunately for biology, that scheme was never carried out, and the opportunity that presented itself some fifty years ago of obtaining State assistance for what was truly a State work has not recurred. Not only has the publication of systematic coastal work been left to isolated ventures, but many groups, and the Annelids among them, have been so little studied on our own coasts that the work of naming any of the most common littoral species (except perhaps the lugworm) is out of all proportion to the value of its determination. Yet these Annelids are not only of great interest to the zoologist, but, as forming one of the chief foods for fish, they are among the most important factors in the welfare of our fisheries. The Ray Society and the Carnegie Trust are therefore to be congratulated on the issue of another section of this great monograph, which they have subsidised. Prof. McIntosh is known and read of all students of biology, and his unwearied devotion to this work, his wide knowledge, and long experience of these Annelids constitute him a master. He, perhaps of all men, was the only one who could write this work, and the completion of his monograph begun so many years ago is indeed a consummation devoutly to be wished. May he have the health and assistance necessary to that end.

The present instalment contains a systematic account of six families. Its most striking feature lies in the coloured plates drawn by the author's sister, the late Mrs. Günther, and the artist Miss A. H. Walker. These presentations of Phyllodocids, Hesionids, Nephthyds, and Syllids are most beautiful, and suggest many problems of coloration and of movement that are not referred to in the text. The fine green colour of many Phyllodocids tingeing even their egg-masses, the prevalence of segmental spots in most families, and the significance of varietal colorations, are subjects on which we possess very little organised knowledge, for if the systematic study of Polychæt Annelids has been neglected in this country, the bionomics and physiology of the groups have been left to a few Continental observers. It is to be hoped that the issue of this work will stimulate the study of the group in these directions.

There are two serious drawbacks to the value of this work which a little trouble could easily have obviated. If one wishes to find out what families, genera, and species are described in this part, there is no means of doing so except by wading through the text. A table of contents is not much to ask for, but it has been omitted, and as there is no index the labour of finding out what there is in the work is quite needlessly enhanced. The headings of the left-hand pages might well have given the family name under consideration instead of the species as at present. The second drawback is the binding of six extraneous plates right in amongst those proper to the part, sandwiched in between those illustrating two other families. These intrusive plates evidently belong to a later section of the work; yet we find no reference to their presence, and the confusion that is likely to arise ought to induce the council of the Ray Society to take some steps in order to avoid the repetition of, and if possible rectify, what we presume must be an oversight.

To turn from matters of editorial criticism, we are glad to see that Mr. Goodrich has given his skilled assistance and expert knowledge of the nephridia of these animals, so that these organs are adequately referred to and figured in the text. The references to other recent work on this subject show that not

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only the merely diagnostic literature, but all that bears upon the subject, has been exhaustively studied.

Among the most interesting sections is the one bearing on the Syllids. It has long been known that these Annelids are capable of asexual reproduction, and that the buds so formed, on assuming maturity, carry their eggs attached to their feet. Prof. McIntosh refers to several interesting cases of bud-formation. Certain American species of Trypanosyllids, for example, give rise to lateral buds, the stock assuming a frond-like appearance. Mr. Crossland has found an East African Syllid which has a crown of buds at its hinder end, and other species which are parasitic on Nemertines, Polychæts, and other hosts. There are some thirty representatives of this family already known from British waters, and their description and changes of form on assuming maturity are fully dealt with.

The distribution of these Polychæt Annelids will undoubtedly form a most interesting mass of evidence when it is collated. In its present form no conclusions can be safely drawn. We can only say that many species have a very wide range, extending to both sides of the Atlantic, and occurring as far north as Greenland and as far south as the Falkland Islands, whilst in some cases the same species is found both in the Atlantic and in the Indian Oceans. It is also clear that the British Polychæt fauna is probably as rich in specific variety as that of any other coasts so far explored. The coasts of Ireland, though not so thoroughly worked as those of the Channel or of the east of Scotland, have yielded many interesting forms, and the careful comparison which the author has instituted between specimens from different localities and between those of our own and of other coasts is but one instance of the careful discrimination and comparison which distinguish the work. We are glad to see that another part is ready for press, and we hope that financial aid will be forthcoming to complete this monograph.

## DIRECT-CURRENT ELECTRICAL ENGINEERING.

*Principles of Direct-current Electrical Engineering.* By J. R. Barr. Pp. viii+454. (London: Whittaker and Co., 1908.) Price 10s. net.

AS the author states in the preface, this treatise was primarily written for the use of intermediate classes in universities and technical colleges, and is based on his lectures to second-year students. It is intended to bridge the gap between the several elementary manuals and the many works on special branches, and in this object the author has succeeded admirably. During the last few years innumerable books dealing with direct-current electrical engineering have appeared, but they are either too elementary or else too highly specialised. This book deals chiefly with principles, but the author has kept not only the theoretical, but also the practical side of the question well in view.

The first two chapters are devoted to the units employed in electrical engineering and the fundamental principles, such as Ohm's law, the heating effect of currents, &c., while the third chapter deals with electromagnetism and the magnetisation of iron. The latter chapter gives the student a clear insight into the magnetic quantities underlying the design of dynamos and motors. A short description is given of Ewing's hysteresis tester and permeability bridge, and the method of using it.

About sixty pages are occupied with a discussion of electrical measuring instruments. The principles governing the construction of ammeters, voltmeters, wattmeters, and electric-supply meters are set out in a clear and practical manner, and even maximum-demand indicators are briefly touched upon.

Two chapters treat of storage batteries and electric lighting, but these are rather disappointing. Surely the short section dealing with metallic filament lamps might have been amplified with some advantage, especially considering the enormous progress made in illuminating engineering. It is, further, somewhat out of date to take up a section with a discussion of 37-volt osmium lamps. Practically speaking, these lamps are not used at all, and in all probability their manufacture has been abandoned for some time. It would have been better to have given us particulars about the osram, wolfram, tungsten, and zircon-wolfram lamps, which are now made for 250-volt circuits, and are of great practical importance. Open, enclosed, and flame-arc lamps are briefly touched upon, as well as illumination and photometry, but on the whole this chapter is, as already said, rather unsatisfactory.

Overhead and underground conductors, and the principal methods of laying cables, as well as the calculation of voltage drop in conductors, are next described in about forty pages.

The last six chapters of the book are devoted to dynamo-electric machinery, its construction, design, and operation, and these chapters are undoubtedly the best in the book. The construction of armatures, commutators, and brushes is very fully dealt with, and the use of coloured diagrams used for illustrating the various methods of armature windings should be extremely useful to students. The theory of the magnetic circuit is gone into very carefully, and it will give the student a clear insight into the calculations required for the design of dynamo-electric machinery.

The methods of determining characteristic curves, parallel operation, and methods of voltage control are also considered, while one chapter deals with motors and controllers. The section on testing is very brief, and it is hoped that in a next edition this may be somewhat enlarged.

In the last chapter we come to the subject of electricity control, and the author enters fully into the points connected with switchboards. The section dealing with fuses, circuit-breakers, lightning arresters, and switches is excellent, and contains a large amount of practical information. Various examples of switchboard designs, illustrated by working drawings, complete a very interesting chapter. At the end of the book there is an appendix containing practical problems to be worked by the students.

The author is to be congratulated upon the work which he has produced. It is not too practical or too

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